WILLIAMS SOUND®
Helping People Hear

INSTALLATION GUIDE & USER MANUAL

Sound Plus™ Infrared Listening System

Model WIR TX90, Two Channel System
Model WIR SYS 90V, Two Channel System
Model WIR SYS 90 PRO, Two Channel System

Transmitter Model WIR TX90
Optional Receiver Models WIR RX22-4, WIR RX14-2, WIR RX18
Optional Charger Models CHG 518, CHG 3512

MAN 119E

SOUNDPLUS™ INFRARED LISTENING SYSTEM,

Model WIR TX90, Two-Channel Listening System
Model WIR SYS 90V, Two-Channel Listening System
Model WIR SYS PRO, Two-Channel Listening System

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System Overview

The WIR TX90 two channel infrared transmitter combines infrared modulator and emitter technology into a single mountable enclosure - reducing operating cost and eliminating precious rack space.

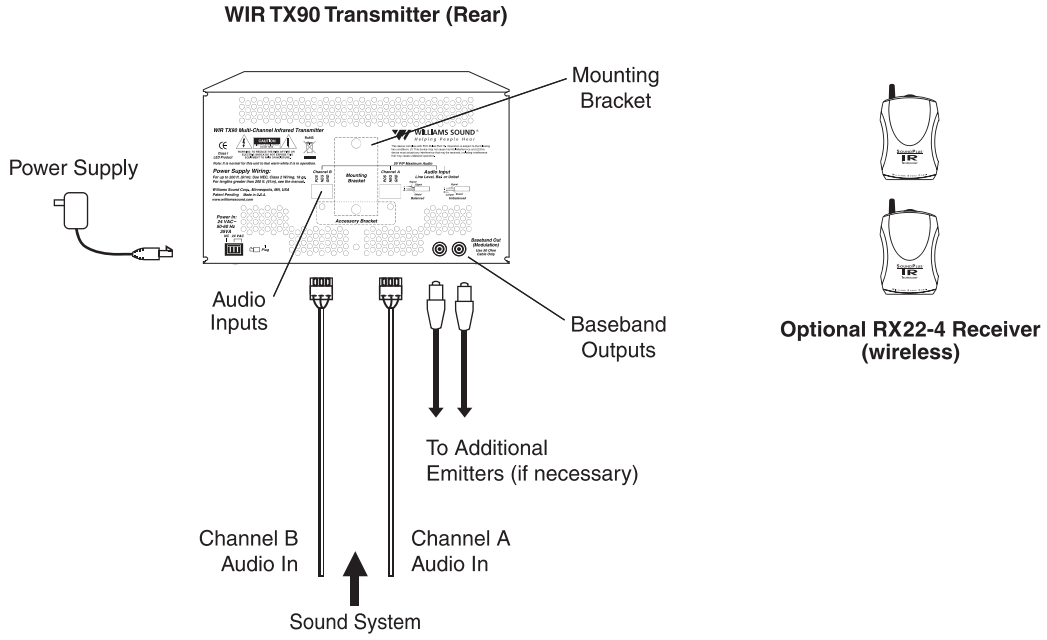
The WIR TX90 features an easy to use configuration preset for Music, Voice, or Hearing Assistance Applications. It operates on dual 2.3/2.8 or 3.3/3.8 MHz selectable frequencies - ideal for high quality audio programs such as music, theater and audio description. The WIR TX90 will accept any line level, balanced or unbalanced audio inputs, and includes adjustable tone and volume control. Infrared receivers detect the transmission and convert the light signals back into audio signals. The 2.3-3.8 MHz operating frequencies minimize high efficiency lighting interference.

No FCC license or radio approval is required with this equipment. It can be used anywhere in the world.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTICE: A PLASMA MONITOR CAN DEGRADE THE AUDIO QUALITY OF THE WIR TX90 TRANSMITTER. FOR BEST PERFORMANCE, THE TRANSMITTER SHOULD BE POSITIONED AS FAR AWAY FROM THE PLASMA MONITOR AS POSSIBLE.

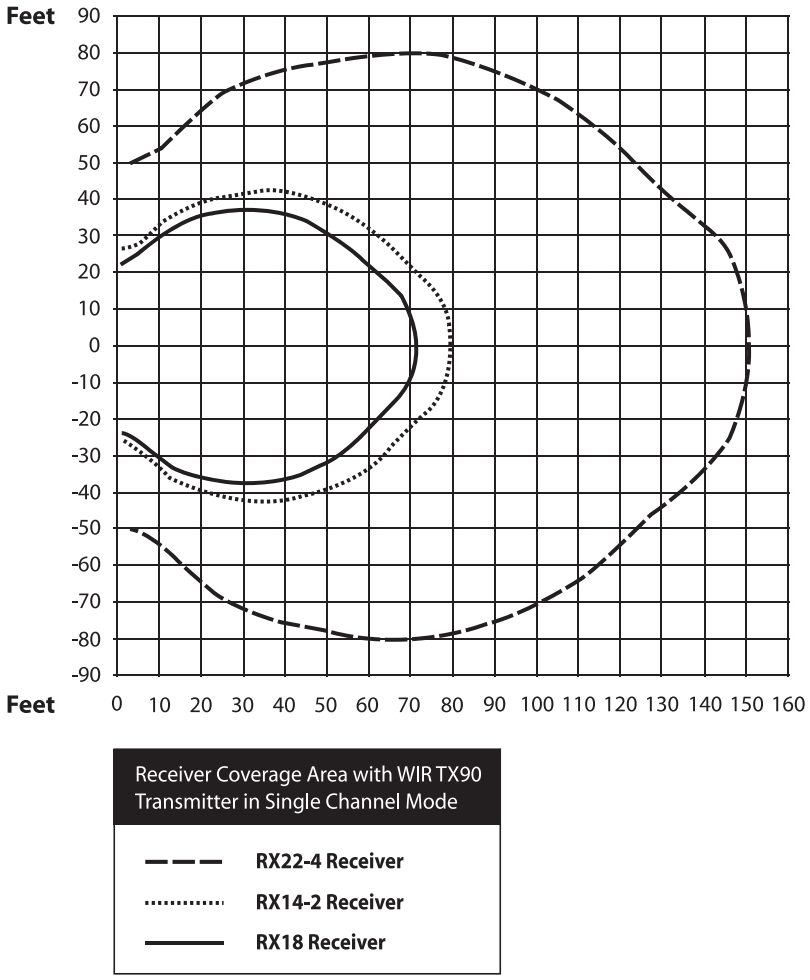
Figure 1: Typical Two-Channel configuration for the WIR TX90



▶ Determine Coverage Area

Determine the coverage area needed for the seating area. When using the WIR TX90 transmitter with the RX22-4 receiver, in single channel mode, the WIR TX90 can achieve a coverage area of 28,000 ft^2 (2,600 m^2). In four channel mode, the WIR TX90 divides its power among the four signals to achieve a coverage area of 11,000 ft^2 (1,022 m^2). NOTE: The coverage area will vary depending on the sensitivity of the infrared receiver being used. The following diagram illustrates coverage area when using a RX22-4, RX14-2, or RX18 receiver with a single WIR TX90 transmitter in single channel mode.

Figure 2: Maximum range when using the RX22-4, RX14-2, or RX18 Receiver



These patterns are the direct radiation pattern. The infrared radiation does not drop to zero outside the illustrated patterns; it decreases. It still may be useable at a greater distance, depending on the receiver sensitivity and the reflective characteristics of the room.

Reflections of the infrared light from walls, ceilings, and floors may change these patterns.
Important: Remember to point the transmitter towards the listening audience!

Remember: opaque objects block infrared light. Thus, the transmitter cannot be concealed behind opaque walls, curtains, etc.

Figure 3: 3 Dimension Foot Pattern

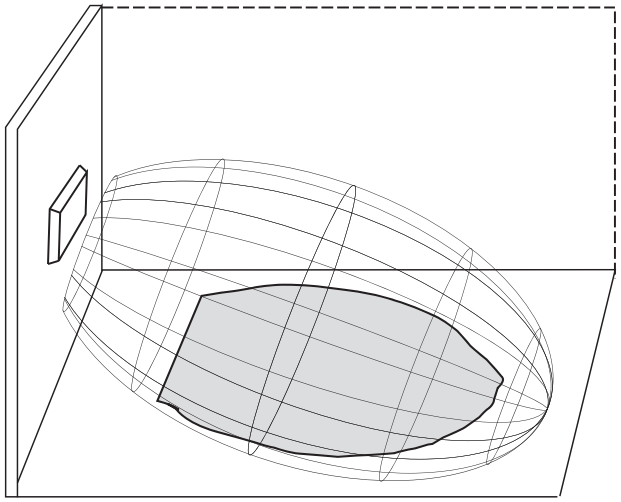


Figure 4: NOTE: When pointing the emitter, be sure to keep the long dimension horizontal.

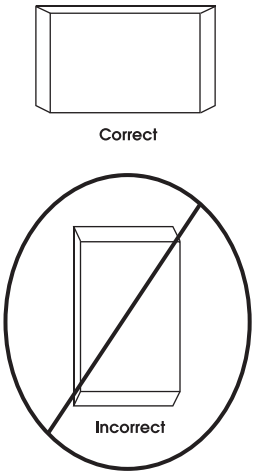


Figure 5: Overlapping Illumination patterns to cover Larger Listening Areas

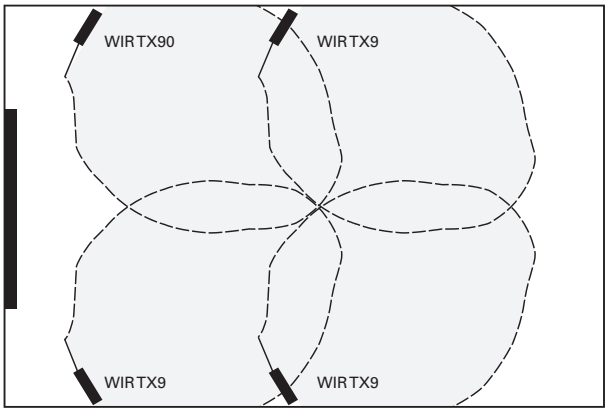


Figure 6: Overlapping Illumination patterns to cover Larger Listening Areas

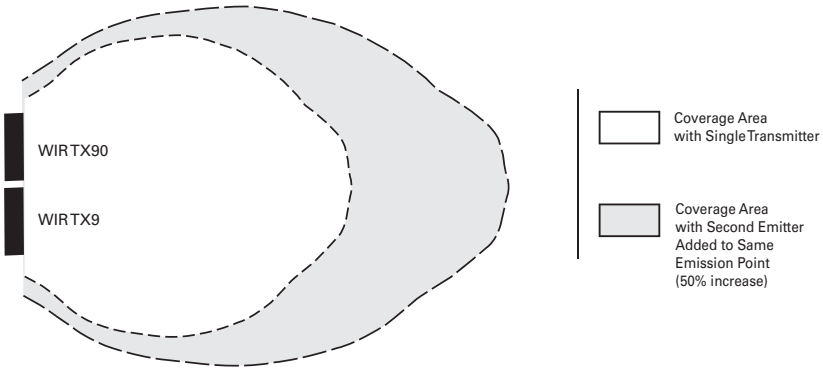
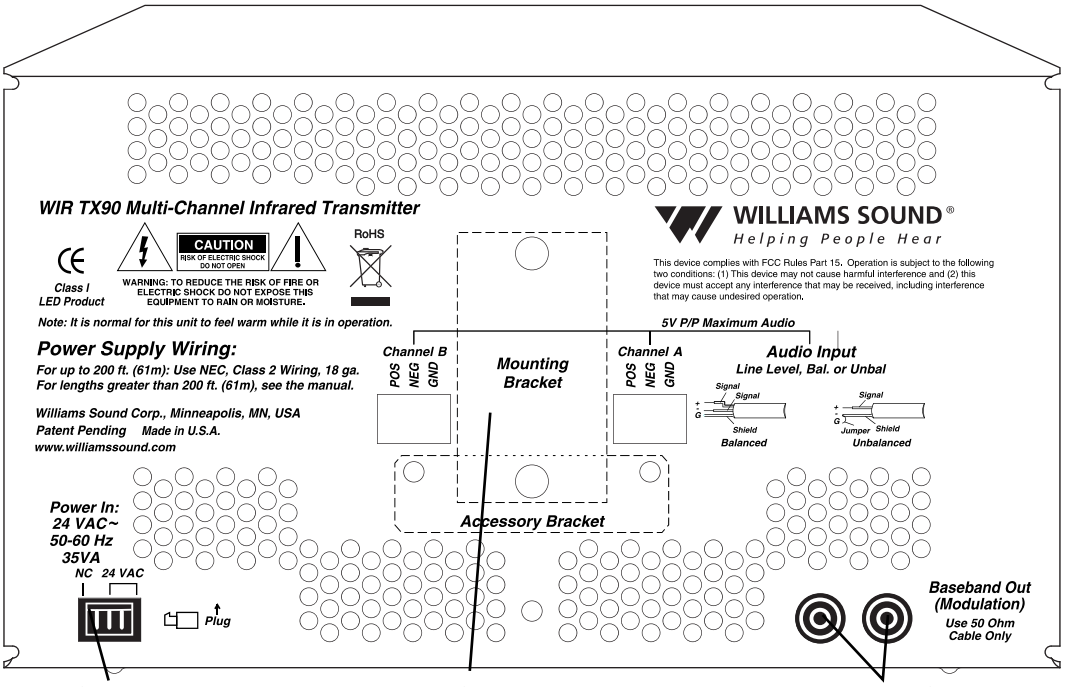

WIRTX90
WIRTX9
Coverage Area with Single Transmitter
Coverage Area with Second Emitter Added to Same Emission Point (50% increase)

FIGURE 7: WIR TX90 REAR VIEW


WIR TX90 Multi-Channel Infrared Transmitter
CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.
Class I LED Product
RoHS
Note: It is normal for this unit to feel warm while it is in operation.
WILLIAMS SOUND®
Helping People Hear
This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference that may be received, including interference that may cause undesired operation.
5V P/P Maximum Audio
Power Supply Wiring:
For up to 200 ft. (61m): Use NEC, Class 2 Wiring, 18 ga.
For lengths greater than 200 ft. (61m), see the manual.
Williams Sound Corp., Minneapolis, MN, USA
Patent Pending Made in U.S.A.
www.williamssound.com
Channel B
POS NEG GND
Mounting Bracket
Channel A
POS NEG GND
Audio Input
Line Level, Bal. or Unbal
Signal
Shield
Balanced
Jumper
Unbalanced
Accessory Bracket
Power In:
24 VAC~
50-60 Hz
35VA
NC 24 VAC
Plug
Baseband Out
(Modulation)
Use 50 Ohm Cable Only

Power Connection
Plug in Power Supply
120 VAC (US): TFP 010
230 VAC (CE): TFP 027

Wall/Ceiling Mounting Bracket (BKT 024)
Set of threaded holes for use with mounting bracket

Baseband Out
BNC Connector, 50 Ω
50 kHz-8 MHz Baseband

▶ CONNECT POWER

WARNING: POWERLINE VOLTAGE MUST NOT FALL BELOW 90V, OR SYSTEM PERFORMANCE WILL BE GREATLY REDUCED!

POWER CONNECTION FOR U.S. APPLICATION

Connect the TFP 010 power supply to the 3-pin Molex™ connector located on the rear of the TX90 (see Figure 8, below).

FOR APPLICATIONS OUTSIDE THE U.S. REQUIRING 240 VAC MAINS SUPPLY:

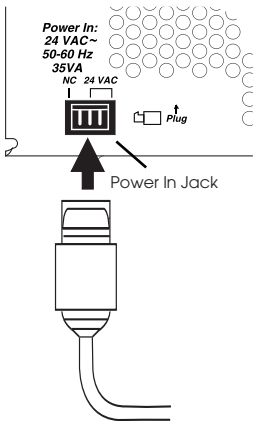
Use the transformer power supply, model TFP 027. Make sure TFP 027 power input switch (located on bottom of power supply) is set to the "230" position.
Secondary specifications: 24 VAC, 35 VA, 50/60 Hz.

Plug the power supply into the AC outlet.
TFP 027-01: 230VAC, Euro Mains Plug
TFP 027-02: 230VAC, UK Mains Plug

NOTE:
The WIR TX90 transmits when a baseband signal is present, and will shut off immediately when no baseband signal is present. This auto shut-off feature preserves the life of the infrared LEDs and reduces power consumption.

This system is designed for class 2, low-voltage wiring. Always follow local electrical codes when doing low voltage wiring.

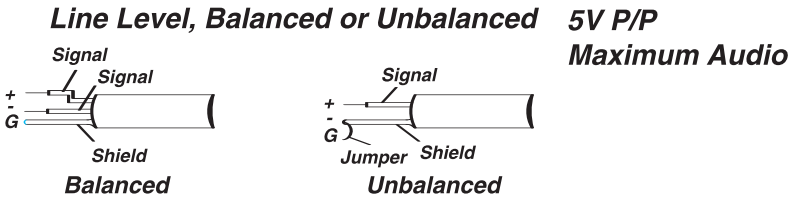
FIGURE 8



▶ Connect Audio Source

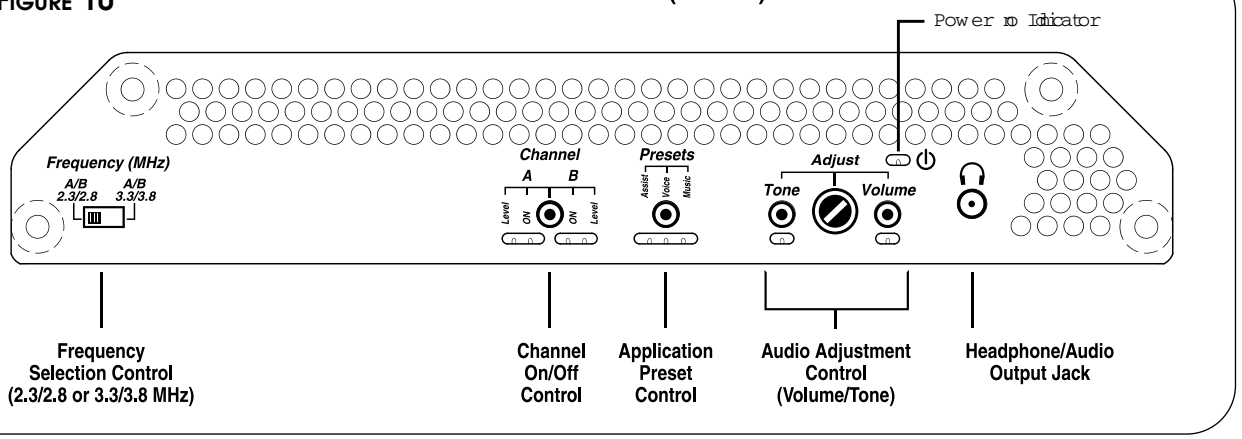
Determine the length of the audio cable needed to connect to the sound system to the WIR TX90 transmitter. Install the supplied Phoenix connector on the end of the audio cable to be connected to the transmitter. See the back of the WIR TX90 for wiring instructions.

Figure 9: Audio Source Connections



The WIR TX90 will accept line level, balanced or unbalanced audio inputs. If you wish to operate in single channel mode, plug the audio cable with the installed Phoenix connector in "Channel A" OR the "Channel B" connector. If you choose to operate in two channel mode, plug the audio cables with Phoenix connectors in both "Channel A" AND "Channel B" connector. NOTE: By default, the WIR TX90 is set to operate in two-channel mode. To turn Channel A or Channel B on/off, refer to the instructions *Selecting a Channel,* below.

Figure 10



▶ Selecting a Carrier Frequency Pair

The WIR TX90 offers two sets of carrier frequencies for Channel A and Channel B: 2.3 and 2.8MHz *or* 3.3 and 3.8MHz.

The WIR TX90 is preset to 2.3 and 2.8 MHz, which are the most commonly used. Move the slide switch to select a pair of operating frequencies.

▶ Selecting a Channel

To activate a channel, press the "CHANNEL" button until the channel "ON" indicator lights. For example, to operate only channel A, press the "CHANNEL" button until only the channel A "ON" indicator lights. To operate both channel A and B, press the "CHANNEL" button until both "ON" indicators light.

Note: If you're only using one channel, make sure the other channel is turned off to maximize system coverage.

▶ Select the Audio Processing Application Preset

The WIR TX90 offers three preset audio processing options for the most common applications: Music, Voice, and Hearing Assist. Use the "Music" setting when maximum dynamic range and audio quality are preferred. Use the "Voice" setting for simultaneous interpretation, audio description, or other applications with users that have primarily normal hearing. Use the "Assist" setting for hearing assistance applications to meet the reduced dynamic range needs of hearing impaired listeners. You may select the same audio pre-set for both Channel A and Channel B, or you may select them independently.

To select the audio processing preset, you must first activate the channel you want to adjust. Press the "channel" button to activate the channel(s) you want to choose an audio processing preset for, then press the "Presets" button to choose the preset. The Music, Voice, or Assist indicator will light to show your selection. After 10 seconds, the setting will be stored.

▶ Adjust Audio Input Level

The TX90 is designed to accept a line-level audio input signal. The "Level" indicator light for each channel is used to help adjust the audio input level. When the indicator does not light, the input signal level is too low. When the indicator is flashing, the signal level is optimal. When the indicator is steadily lit, but does not flash, the input level is too high and can cause distortion. You can adjust the input level of both channels simultaneously, or independently.

Make sure the input audio signal is connected to the WIR TX90. To adjust the audio input level, first activate the channel(s) you want to adjust by pressing the "CHANNEL" button, then press the "VOLUME" button. The Volume indicator will light. Now, turn the "ADJUST" knob clockwise to increase the input signal or counter-clockwise to decrease the input signal until the channel "Level" indicator is flashing. After 10 seconds, the setting will be stored.

** **IMPORTANT** **
Audio level NORMAL (optimal): the audio indicator level will **flash at a 1 second rate**.
Audio level too HIGH: the audio indicator level will **stay on** or **flash erratically**.
Audio level too LOW: the audio indicator level will be **off**.

▶ Adjust Tone

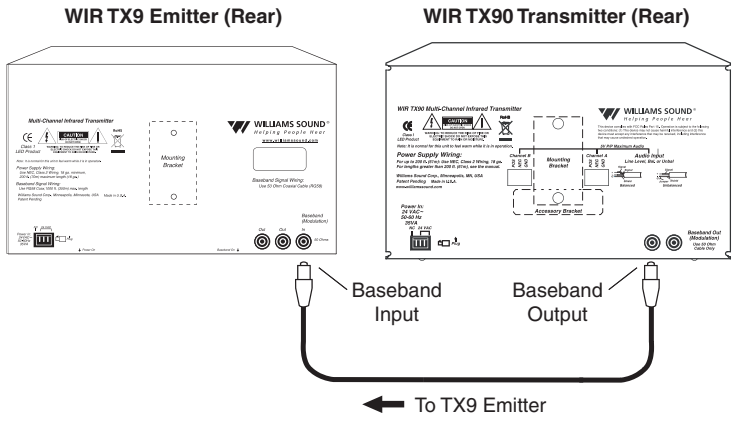
The WIR TX90 has a tone adjustment to suit user preference and to compensate for the different frequency responses of various infrared receiver models. First, make sure the audio source is active. Use a receiver from the system to listen to the signal as you adjust the tone control.

To adjust the tone, first activate the channel(s) you want to adjust by pressing the "CHANNEL" button, then press the "TONE" button. The tone indicator will light. Now turn the "ADJUST" knob clockwise to emphasize high frequencies (best for hearing assistance use). When you have reached the maximum adjustment, there will be no further change in tone. Turn the "ADJUST" knob counter-clockwise to decrease the high frequency emphasis. When you have reached the minimum adjustment, there will be no further change in tone. After 10 seconds, the setting will be stored.

Using the Optional WIR TX9 Slave Emitter for Additional Coverage

For larger facilities, additional emitter panels can be used to increase the overall coverage area. In these cases, we recommend using the WIR TX9 slave emitter in tandem with the WIR TX90. The WIR TX90 can drive multiple WIR TX9 emitters at one time. Each TX9 emitter will require its own power supply.

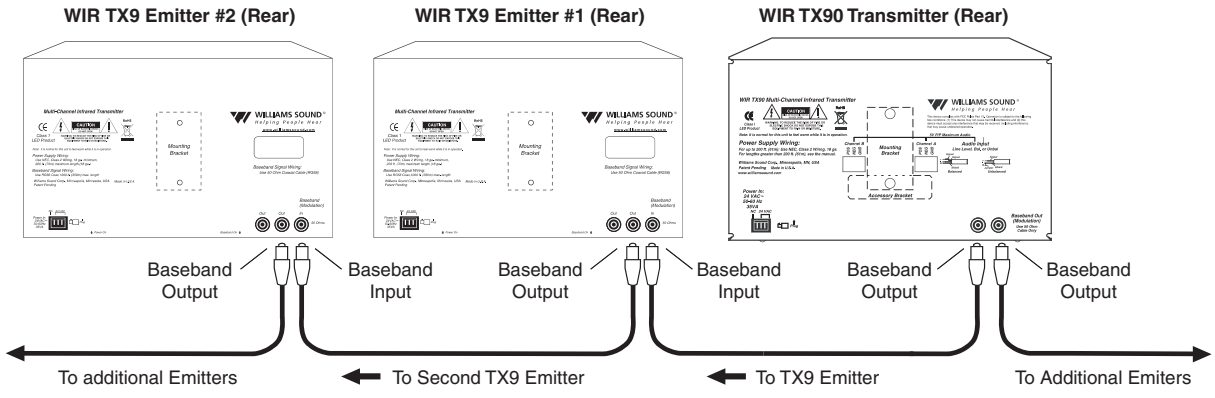
Figure 11: Connecting a WIR TX9 Emitter to a WIR TX90 Transmitter



To add a second WIR TX9 emitter panel to the WIR TX90 transmitter, repeat the process above (the WIR TX90 transmitter has two baseband output jacks).

Note: The WIR TX9 emitter panels can be "chained" together if needed for unlimited coverage area. Each WIR TX9 emitter will require its own power supply. See Figure 12 below.

Figure 12: Chaining multiple WIR TX9 Emitters Together



Receiver Safety Information

Hearing Safety

CAUTION!

Williams Sound receivers are designed to amplify sounds to a high volume level which could potentially cause hearing damage if used improperly. **To protect your hearing and the hearing of others:**

1. Make sure the volume is turned down before putting on the earphone or headphone before adjusting the volume to a comfortable level.
2. Set the volume level at the minimum setting that you need to hear.
3. If you experience feedback (a squealing or howling sound), reduce the volume setting and move the microphone away from the earphone or headphone.
4. Do not allow children **or other unauthorized persons** to have access to the receiver.

Battery Safety and Disposal

CAUTION!

Williams Sound receivers are supplied with disposable Alkaline batteries. Do not attempt to recharge disposable batteries, which may explode, release dangerous chemicals, cause burns, or other serious harm to the user or product.

Pacemaker Safety

CAUTION!

1. **Before** using Williams Sound receivers with a pacemaker or other medical device, consult your physician or the manufacturer of your pacemaker or other medical device.
2. If you have a pacemaker or other medical device, make sure that you are using the Williams Sound receiver in accordance with safety guidelines established by your physician or the pacemaker manufacturer.

Recycling Instructions

Battery Safety and Disposal

Help Williams Sound protect the environment! Please take the time to dispose of your equipment properly.

Product Recycling for Customers in the European Union:
Please do NOT dispose of your Williams Sound equipment in the household trash. Please take the equipment to a electronics recycling center; OR return the product to the factory for proper disposal.

Battery Recycling for Customers in the European Union:
Please do NOT dispose of used batteries in the household trash. Please take the batteries to a retail or community collection point for recycling.

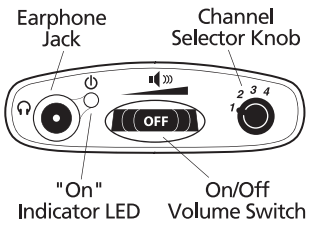
11/20/07

Optional Infrared Receivers

Figure 13: Four Channel Receiver, Model WIR RX22-4

Channel	Frequency
1	2.3 MHz
2	2.8 MHz
3	3.3 MHz
4	3.8 MHz

RX22-4 Front



RX22-4 Top

Figure 14: WIR RX14-2 Headset Receiver

FRONT VIEW

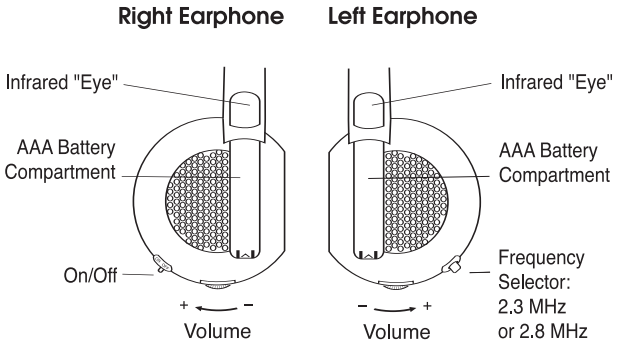
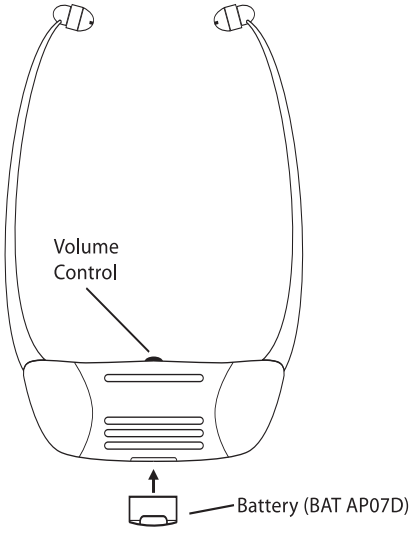


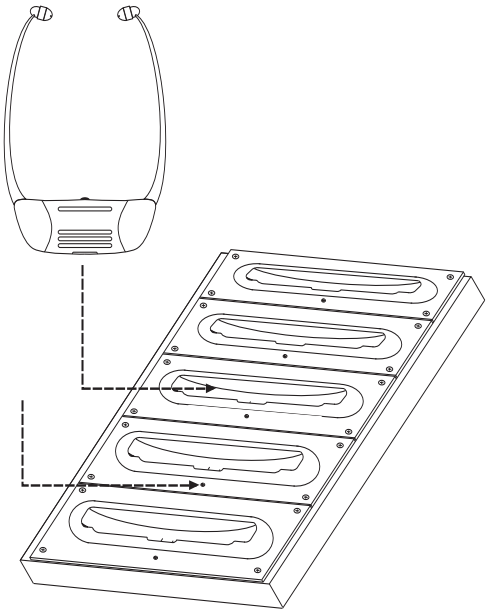
Figure 15: WIR RX18 Under-the-chin Receiver

WIR RX18 Front View

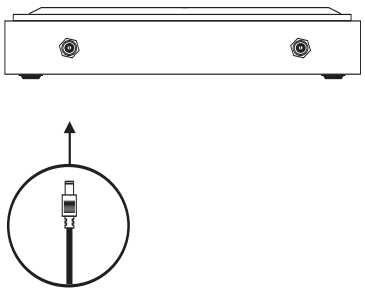


Optional Chargers

Figure 16: Multiple Battery Charger, Model CHG 518

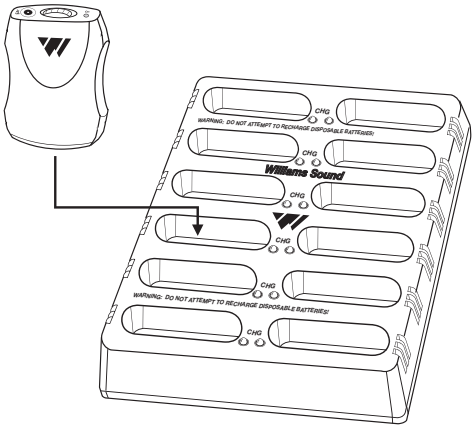


CHG 518 Top

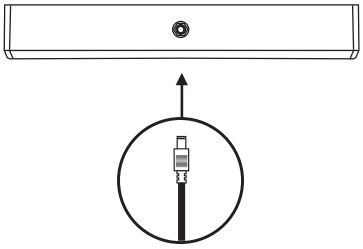


CHG 518 Back

Figure 17: Multiple Battery Charger, Model CHG 3512



CHG 3512 Top



CHG 3512 Back

Trouble Shooting

The WIR TX90 "Power On" Indicator is Not Lit.

- Make sure the transformer is plugged into the transmitter and any remote power switch is on.
- Make sure the electrical outlet is on.
- Make sure the 24 VAC power supply is working.

The WIR TX90's Channel A or B "On" Indicator Is Not Lit.

- Make sure the desired audio channel has been activated. See *Selecting a Channel* on page 7.
- Make sure the WIR TX90 is plugged in.
- Make sure the audio input is connected properly. See page 6 or instructions on the back of the WIR TX90.
- Make sure an active audio signal is being sent to the WIR TX90 transmitter.

No Sound Through Receivers.

- Check to make sure the receiver is operating on the same frequency as the transmitter.
- If some of the receivers work but others don't, check for bad batteries or earphones on the receivers that aren't working.
- If none of the receivers work, check to see if the power and audio input cable are connected to the transmitter and that the WIR TX90 "Power On" and Channel A or B "On" indicator is illuminated.
- Check to see if the transmitter is connected properly to the sound system. The audio level indicators should flash on channels that are selected.
- Make sure the "eye" is not covered up on the receiver. There must be clear line of sight between the receiver eye and the transmitter panel.

Sound Through The Receivers Is Weak And Noisy.

- Listen to the audio signal through the headphone jack on the WIR TX90 transmitter (Figure 10). If the signal is weak and noisy here, try increasing the audio input level (see *Adjust Audio Input Level*, page 8), or increase the input signal level from the sound system by turning up the mixer control. If the signal sounds okay, you may need to reposition the transmitter panel or add additional IR emitters to the TX90 system.

Buzzing Or Humming Noise In Sound System.

- Check for ground loops or noise on the input signal. Call your Authorized Williams Sound dealer or representative.

NOTE: Make sure the powerline voltage does not fall below 90V, or system performance will be greatly reduced!

Limited Warranty

Williams Sound products are engineered, designed, and manufactured under carefully controlled conditions to provide you with many years of reliable service. Williams Sound warrants the Sound Plus™ Infrared Listening System against defects in materials and workmanship for FIVE (5) years. During the first five years from the purchase date, we will promptly repair or replace the Sound Plus™ Infrared Listening System.

Microphones, earphones, headphones, batteries, chargers, cables, carry cases, and all other accessory products carry a 90-day warranty.

WILLIAMS SOUND HAS NO CONTROL OVER THE CONDITIONS UNDER WHICH THIS PRODUCT IS USED. WILLIAMS SOUND, THEREFORE, DISCLAIMS ALL WARRANTIES NOT SET FORTH ABOVE, BOTH EXPRESS AND IMPLIED, WITH RESPECT TO THE SOUND PLUS™ INFRARED LISTENING SYSTEM, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WILLIAMS SOUND SHALL NOT BE LIABLE TO ANY PERSON OR ENTITY FOR ANY MEDICAL EXPENSES OR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY ANY USE, DEFECT, FAILURE OR MALFUNCTIONING OF THE PRODUCT, WHETHER A CLAIM FOR SUCH DAMAGES IS BASED UPON WARRANTY, CONTRACT, TORT OR OTHERWISE, THE SOLE REMEDY FOR ANY DEFECT, FAILURE OR MALFUNCTION OF THE PRODUCTS REPLACEMENT OF THE PRODUCT. NO PERSON HAS ANY AUTHORITY TO BIND WILLIAMS SOUND TO ANY REPRESENTATION OR WARRANTY WITH RESPECT TO THE SOUND PLUS™ INFRARED LISTENING SYSTEM. UNAUTHORIZED REPAIRS OR MODIFICATIONS WILL VOID THE WARRANTY.

The exclusions and limitations set out above are not intended to, and should not be construed so as to contravene mandatory provisions of applicable law. If any part or term of this Disclaimer of Warranty is held to be illegal, unenforceable, or in conflict with applicable law by a court of competent jurisdiction, the validity of the remaining portions of this Disclaimer of Warranty shall not be affected, and all rights and obligations shall be construed and enforced as if this Limited Warranty did not contain the particular part or term held to be invalid.

If you experience difficulty with your system, call Toll-Free for customer Assistance:
1-800-843-3544 (U.S.A.) or +1 952 943 2252 (Outside the U.S.A.)

If it is necessary to return the system for service, your Customer Service Representative will give you a Return Authorization Number (RA) and shipping instruction.
Pack the system carefully and send it to:

Williams Sound Corp.
Attn: Repair Dept.
10321 West 70th Street
Eden Prairie, MN 55344 USA

Your warranty becomes effective the date you purchase your system. Your returned warranty card is our way of knowing when your warranty begins. It also gives us important information about your system including the serial number. This information will help us serve you better in the future. Please take a moment to complete and mail the attached card. Thank you.

SoundPlus™ Infrared Listening System Specifications
Model WIR TX90

Infrared Transmitter, Model WIR TX90

Dimensions, Weight:	11.25" W x 6.25" H x 2.125" D (28.6 cm x 15.9 cm x 5.4 cm), 1.8 lbs (0.8 kg)
Color:	Black with white legends, black acrylic lens
Power Supply:	Wall Transformer, 24 VAC, 50-60 Hz, 35 VA, 3-pin MOLEX Connector North America: TFP 010, UL/CSA Europe: TFP 027-01, 2-pin Schuko plug, CE UK: TFP 027-02, 3-pin UK plug, CE
Power Cable:	NEC Class 2 wiring, two-conductor, 18 ga., 200' (61m) max. length
Modulation:	FM Wideband, ±50kHz deviation max., 50uS pre-emphasis
Carrier Frequency:	Channel A: Selectable, 2.3/2.8 MHz, Channel B: Selectable, 3.3/3.8 MHz
Emitter IR Power:	3.5 watts
Coverage Area:	Up to 28,000 ft^2 (2,600 m^2) in single-channel mode when using the RX22-4 Receiver Up to 18,000 ft^2 (1,670 m^2) in four-channel mode when using the RX22-4 Receiver Up to 3,500 ft^2 (325 m^2) in single-channel mode when using the RX14-2 Receiver Up to 3,063 ft^2 (285 m^2) in single-channel mode when using the RX18 Receiver (See coverage area diagrams)
Signal-to-Noise Ratio:	>75 dB, ±3dB
Frequency Response:	80 to 15,000 Hz, electrical response
Total Harmonic Distortion:	Less than .2%, electrical response at 1kHz
Compression:	Music preset 1:1, Voice preset 1.5:1, Hearing Assist preset 2:1
Auto Carrier Shut-Off:	20 minute timer shuts off carrier when no audio is present
Power Indicator:	Red LED
Audio Volume Level Controls:	CHA and CHB Input Level, press to select, 28 dB adjustable range
Audio Indicators:	CHA and CHB Audio Level, yellow LED, flash
Carrier LEDs:	2 green LED carrier "on" indicators
Phones Output:	3.5mm TRS headphone jack. CH A tip, CH B ring on jack, 32 ohm headphone (min)
Application Preset:	Music, Voice, Hearing Assist. Frequency response; Music: Flat; Voice: Mid-range boost; Hearing Assist: High frequency boost
Tone Control:	Press to select, 21 dB adjustable range (1 kHz between low boost/hi-cut and low cut/hi boost).
Power Input:	3-Pin Molex, 24 VAC, 50-60 Hz, 35 VA
Audio Input Connector:	CHA and CHB, 3 wire Phoenix
Input Level:	Balanced or unbalanced, 316 mVRMS (-10dBV) nominal, 5.7k input impedance; max input (over volume range) -21 to +7 dBV.
Baseband Output:	BNC, 50 Ω, for use with TX9 only
Baseband Cable:	RG 58 Coax, BNC connectors, maximum 1000' (300m) length
Operating Requirements:	0-50° C (+32°F to 122°F) ambient temperature, non-condensing, non-corrosive atmosphere
Mounting Kits:	Wall or Ceiling Mount: BKT 024 Omnidirectional mount; Optional: Mic Stand Kit: SS-10; or Tripod Stands: SS-11 or SS-6
Warranty:	5 years on transmitter, 90 days on accessories
Approvals:	CE, FCC, RoHS, WEEE
Compatible Receivers:	WIR RX22-4 Four-Channel Receiver, WIR RX22-4 Four-Channel Receiver, WIR RX14-2 Two-Channel Receiver, WIR RX18 Two-Channel Receiver
Notes:	Specifications: Single end input, volume & tone controls at mid point, 1 kHz, "Music" Preset

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NOTE: Specifications subject to change without notice.

WILLIAMS SOUND®

Helping People Hear

10321 West 70th St., Eden Prairie, MN 553
800.843.3544 | 952.943.2252 | FAX: 952.9
www.williamssound.com

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